TECHNISCHE UNIVERSITÄT WIEN
Institut für Computergraphik und Algorithmen
Arbeitsbereich für Computergraphik

OESTERREICHISCHE COMPUTER GESELLSCHAFT
AUSTRIAN COMPUTER SOCIETY

laden gemeinsam zum

GASTVORTRAG

Andrew Straw
Institute of Molecular Pathology, Vienna

"Combining Virtual Reality and Genetics to Understand the Fruit Fly Brain"

Abstract:

A fundamental question in neuroscience is how simultaneous, distributed activity across the nervous system orchestrates animal-environment interaction to produce adaptive behavior. The visual system of the fly has been intensively studied for six decades from computational, behavioral, physiological, developmental, genetic, and optical perspectives and is perhapsthe best understood system of any brain. Despite this wealth of knowledge, our understanding of the behavioral capabilities of flies, and consequently how this well-studied part of the nervous system is involved in these tasks, remains rudimentary. To address this limitation, I and my colleagues have developed a realtime computer vision system for tracking freely flying flies. Combined with a virtual reality system built on computer games technology, we are using this automated system to ask how the fly perceives its world and structures its movement through it. In this talk, I will describe a recent study using this apparatus in which we discovered that fruit flies use nearby horizontal edges for regulating their altitude. We are now extending this system to quantify spatial working memory in flies. Furthermore, by utilizing modern molecular genetic techniques, we can inactivate a handful of neurons in the fruit fly brain, and by correlating these manipulations with behavioral deficits measured using the VR system, we can establish a correspondence between particular brain circuits and their role in behavior.

Biography:

Andrew Straw received his Ph.D. in Physiology in 2004 from the Universityof Adelaide, Australia studying motion vision in the hoverfly using electrophysiological approaches. He then moved to the California Institute of Technology where he was a postdoc and senior research fellow, and studied visually guided flight behavior of the fruit fly. In November, 2010 he began his own laboratory at the Institute of Molecular Pathology, Vienna,where he is combining experimental approaches he developed with modern molecular genetic tools to elucidate the structure and function of the flybrain.

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